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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/677,811	10/02/2003	Karl D. Sears	177079-00270	9134

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EXAMINER

CORDRAY, DENNIS R

ART UNIT	PAPER NUMBER
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1731

DATE MAILED: 06/06/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/677,811	SEARS ET AL.	
	Examiner	Art Unit	
	Dennis Cordray	1731	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 April 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-48 and 54-60 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-48, 54-60 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) ☒ Notice of References Cited (PTO-892) | 4) ☐ Interview Summary (PTO-413) |
| 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date: _____ |
| 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) ☐ Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date: _____ | 6) ☐ Other: _____ |

DETAILED ACTION

Examiner's Note

It is noted that the first paragraph of the Remarks on p 9 states that claims 39-53 have been cancelled. Since the amended Claim set only lists Claims 49-53 as being cancelled, it is assumed that the amended Claims are correct and that Claims 39-48 have not been cancelled.

Claim Objections

Claims 13-19, 31-37, 48 and 55-60 are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form.

Claims 13, 31 and 48 recite a crosslinking agent comprising a C₂-C₉ polycarboxylic acid, but each claim refers to a previous claim that recites a polymeric polycarboxylic acid crosslinking agent. A C₂-C₉ polycarboxylic acid is different from a polymeric polycarboxylic acid, thus Claims 13, 31 and 48 fail to further limit the referenced claims. If further evidence of the difference is needed, please see Sears et al (US 2004/0074616), p 2, par 22 which recites a polymeric carboxylic acid crosslinking agent and a second crosslinking agent, preferably citric acid (a polycarboxylic acid). Thus a polycarboxylic acid is a monomer and not a polymer and it is improper to substitute one for the other.

Claims 14-19, 32-37 and 55-60 recite caustic treated cellulosic fibers with interfiber cross-links, but each claim refers to a previous claim that recites caustic

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treated cellulosic fibers with intrafiber cross-links. It is not clear whether the caustic treated cellulosic fibers are intended to have interfiber cross-links or intrafiber cross-links or both.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 13-19, 34-37, 48 and 55-60 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 13, 31 and 48 each recite a crosslinking agent comprising a C₂-C₉ polycarboxylic acid, but each claim refers to a previous claim that recites a polymeric polycarboxylic acid crosslinking agent. It is not clear whether the intended meaning is that the polymeric polycarboxylic acid comprises C₂-C₉ polycarboxylic acid monomeric units or that that a second crosslinking agent comprising a monomeric C₂-C₉ polycarboxylic acid is applied to the sheet of cellulosic fibers (see further explanation under the Claim Objections above for the same claims).

Claims 14-19 recite the limitation " caustic treated cellulosic fibers with interfiber cross-links " in Claim 1. There is insufficient antecedent basis for this limitation in the claim.

Claims 32-37 recite the limitation " caustic treated cellulosic fibers with interfiber cross-links " in Claim 20. There is insufficient antecedent basis for this limitation in the claim.

Claims 55-60 recite the limitation " caustic treated cellulosic fibers with interfiber cross-links " in Claim 38. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-7 and 14-19 are rejected under 35 U.S.C. 102(b) as being anticipated by Chatterjee (3932202).

Chatterjee discloses a method of crosslinking cellulosic fibers comprising steps of forming a wet laid sheet, applying a crosslinking agent, drying the sheet and affecting crosslinking in the dry state (col 3, lines 3-5 and col 6, lines 9-18). The crosslinking agent can be any dry crosslinking agent, for example a dicarboxylic acid (a C₂-C₉ polycarboxylic acid) or polymeric carboxylic acid (if evidence is needed that polymeric carboxylic acid is a known dry crosslinking agent, see Sun et al, 6264791, col 2, lines 3-14 or Sears et al, 6620293, col 1, lines 47-59). Chatterjee also discloses pretreating the fibers to remove much of the hemicellulose such that there is little tendency for interfiber

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crosslinking, thus to promote intrafiber crosslinking (col 3, lines 10-15 and col 4, lines 50-57). The pretreatment includes treating with of from 5-12% of a cold caustic solution, which range encompasses the claimed solution strengths for non-mercerizing conditions (col 4, lines 61-68). Chatterjee further discloses examples of fibers having a hemicellulose content of 8.5 to 15.2% which significantly overlap thus anticipate the claimed range (col 6, Table 1). An example of a crosslinked sheet having a hemicellulose content of 8.5% and an absorbent capacity of 15.74 cc/gm (which is approximately 15.6 gm/gm when the density of the saline solution is applied) (col 7, Table 5).

Since the process is the same as the claimed process, the other absorbent properties would be inherent in the crosslinked structure.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 8-13, 20-48 and 54-60 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sun et al (6264791) in view of Chatterjee.

Sun et al discloses a method of crosslinking comprising formation of a wet laid sheet, treating with a polymeric maleic acid crosslinking agent, drying the sheet, and curing the sheet to affect crosslinking. The crosslinking agent can be a homopolymer,

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copolymer or terpolymer of maleic acid, which is a C₂-C₉ polycarboxylic acid (col 4, lines 40-47 and 64-66). The molecular weight of the crosslinking solution is from 500 to 5000, which significantly overlaps the claimed ranges (col 5, lines 29-31). The pH range of the solution is between 3 and 7, which significantly overlaps the claimed ranges (col 6, lines 19-22). In fact, a specific example of a crosslinking solution is disclosed, BELCLEN DP-80, which is used in many of the examples of the instant specification (col 5, lines 16-19). The fibers used in the web can be chemically treated fibers (i.e.-mercerized or treated with caustic) (col 3, lines 56-58). The crosslinked fibers can be used for bulking material, toweling, intake layer (acquisition layer) for personal hygiene products or as absorbent pads (absorbent core) (col 12, lines 24-39).

Sun et al does not disclose fibers treated with caustic under non-mercerizing conditions. The instant disclosure teaches on pages 6 and 7 that it is well known that mercerizing conditions include low temperature (i.e.-15-35 °C) and high caustic solution strengths (i.e.-10% sodium hydroxide strength or greater). The instant disclosure also teaches on pages 8 and 9 that non-mercerizing conditions include treatment with lower than 10% sodium hydroxide and/or at temperatures greater than 35 °C.

Chatterjee discloses a method of crosslinking cellulosic fibers comprising steps of forming a wet laid sheet, applying a crosslinking agent, drying the sheet and affecting crosslinking in the dry state (col 3, lines 3-5 and col 6, lines 21). Chatterjee also discloses pretreating the fibers to remove much of the hemicellulose such that there is little tendency for interfiber crosslinking, thus to promote intrafiber crosslinking (col 3, lines 10-15 and col 4, lines 50-57). The treatment includes treating with from 5-12% of

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a cold caustic solution, which range encompasses the claimed solution strengths (col 4, lines 61-68). Chatterjee teaches that it is uneconomical to try to remove all of the hemicellulose unless the particular product demands it (col 5, lines 1-6). Chatterjee further discloses examples of fibers having a hemicellulose content of 8.5 to 15.2% (col 6, Table 1).

The art of Sun et al, Chatterjee and the instant invention are analogous as they pertain to the crosslinking of cellulosic fiber sheets. It would have been obvious to one of ordinary skill in the art to pretreat the fibers using a caustic solution of low concentration prior to crosslinking using the method of Sun et al in view of Chatterjee to reduce the cost of the crosslinking operation while minimizing interfiber crosslinking. It would also have been obvious to obtain the claimed absorbent properties since the fibers, crosslinking agent and crosslinking conditions are the same as those claimed.

Claims 8-13, 20-48 and 54-60 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sears et al (6620293) in view of Chatterjee.

Sears et al discloses a method of crosslinking comprising formation of a wet laid sheet comprising mercerized cellulosic fibers, treating with a solution containing carboxylic acid crosslinking agents, drying the sheet, and curing the sheet to affect crosslinking (Abstract). The crosslinking agent can be a homopolymer, copolymer or termonomer of maleic acid, which is a C₂-C₉ polycarboxylic acid (col 4, lines 53-62). The molecular weight of the crosslinking solution is from 400 to 100000, preferably from 400 to 4000, which encompasses the claimed ranges. The pH range of the solution is

between 1.5 and 5.5, preferably from 2.5 to 3.5, which is identical to the claimed ranges (col 6, lines 35-37). In fact, a specific example of a crosslinking solution is disclosed, BELCLEN DP-60, which is used in many of the examples of the instant specification (col 9, lines 4-7). The crosslinked fibers can be used for bulking material, toweling, acquisition layers or absorbent cores for personal hygiene products, diapers, etc., or as filters (col 7, lines 8-9, 20-25). A second crosslinking agent is disclosed as well as several examples of C₂ to C₉ polycarboxylic acids (col 6, lines 20-27).

Sears et al does not disclose fibers treated with caustic under non-mercerizing conditions.

As indicated in the previous rejection of the same claims, Chatterjee discloses pretreating the fibers prior to sheet formation with from 5-12% of a cold caustic solution to remove much of the hemicellulose such that there is little tendency for interfiber crosslinking. Chatterjee discloses examples of fibers having a hemicellulose content in the claimed range an absorbent capacity in the claimed range.

The art of Sears et al, Chatterjee and the instant invention are analogous as they pertain to the crosslinking of cellulosic fiber sheets. It would have been obvious to one of ordinary skill in the art to pretreat the fibers using a caustic solution of low concentration prior to crosslinking using the method of Sears et al in view of Chatterjee to reduce the cost of the crosslinking operation while minimizing interfiber crosslinking. It would also have been obvious to obtain the claimed absorbent properties since the fibers, crosslinking agent and crosslinking conditions are the same as those claimed.

Response to Arguments

Applicant's arguments filed 4/19/2006 have been fully considered but they are not persuasive.

Applicant argues on p 9 that a polymeric carboxylic acid, as defined in the Specification, is a compound having multiple carboxylic groups available for forming ester bonds with cellulose. Applicant also argues that a polymeric carboxylic acid includes C2-C9 polymeric carboxylic acids, such as for example citric acid. The Specification on p 10, par 35 states "the term 'a polymeric carboxylic acid' refers to a polymer having multiple carboxylic groups available for forming ester bonds with cellulose." Thus the term requires a polymer, not a monomer. Later in the same paragraph, Applicant recites citric acid as being a suitable polymeric carboxylic acid, which is incorrect and in direct contradiction to the earlier definition. Citric acid is a monomer and not a polymer, thus cannot fit into the first definition of polymeric carboxylic acid. Applicant also recites a second crosslinking agent that can be a polycarboxylic acid (not a polymeric carboxylic acid) such as citric acid (p 13, par 41). Furthermore, as taught in a previous application having at least one inventor in common with the instant application (US 2004/0074616, p 2, par 22), citric acid is labeled a polycarboxylic acid and is recited as a separate entity from a polymeric carboxylic acid in the same sentence.

Claim terms are ordinarily presumed to have the ordinary and customary meanings attributed to them by those of ordinary skill in the art. However, an applicant is entitled to be his or her own lexicographer and may rebut the presumption that claim

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terms are to be given their ordinary and customary meaning by clearly setting forth a definition of the term that is different from its ordinary and customary meaning. See *In re Paulsen*, 30 F.3d 1475, 1480, 31 USPQ2d 1671, 1674 (Fed. Cir. 1994) and *Vitronics Corp. v. Conceptronic Inc.*, 90 F.3d 1576, 1582, 39 USPQ2d 1573, 1576 (Fed. Cir. 1996). Where an explicit definition is provided by the applicant for a term, that definition will control interpretation of the term as it is used in the claim. *Toro Co. v. White Consolidated Industries Inc.*, 199 F.3d 1295, 1301, 53 USPQ2d 1065, 1069 (Fed. Cir. 1999). Any special meaning assigned to a term "must be sufficiently clear in the specification that any departure from common usage would be so understood by a person of experience in the field of the invention." *Multiform Desiccants Inc. v. Medzam Ltd.*, 133 F.3d 1473, 1477, 45 USPQ2d 1429, 1432 (Fed. Cir. 1998). In the instant case, Applicant has given two conflicting meanings to the term "a polymeric carboxylic acid," one as a polymer and one as a monomer. Since the intended meaning is not clear, the claims will be examined as if the term has the ordinary and customary meaning attributed to it by those of ordinary skill in the art, namely a polymer having multiple carboxylic groups. The Objection to the Claims as well as their Rejection under 35 U.S.C. 112 is maintained.

Applicant argues on p 10 that Chatterjee cannot anticipate the instant invention because the crosslinking agent disclosed is formaldehyde. Chatterjee states that the invention is disclosed with reference to formaldehyde as crosslinking agent for the purpose of illustration, but states that other dry crosslinking agents can be used, reciting some examples that include C₂-C₉ carboxylic acids (col 2, lines 26-40). It is well known

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that C₂-C₉ carboxylic acids as well as polymeric carboxylic acids are dry crosslinking agents for cellulosic fibers (if evidence is needed, see Sun et al, 6264791, col 2, lines 3-14 or Sears et al, 6620293, col 1, lines 47-59), thus the recitation of other dry crosslinking agents includes C₂-C₉ carboxylic acids and polymeric carboxylic acids.

Applicant argues on pp 10-11 that Sun et al teaches away from the method of the instant invention by reciting a tissue having high wet resiliency, high wet strength and a high wet:dried tensile strength ratio. Applicant argues that such properties are only possible from interfiber crosslinking rather than intrafiber crosslinking. Note that, in the last line of p 10 and first two lines of p 11, Applicant states that the instant invention recites curing the crosslinking agent...to form a sheet of fibers with **inter**fiber crosslinks, a statement that appears to contradict the argument. Note also that the amended claims include both intrafiber and interfiber crosslinked cellulosic fibers.

While the treatment with caustic is intended to favor intrafiber crosslinking, applicant neither states in the Specification nor in the Claims that interfiber crosslinking does not occur. Applicant states on p 5, par 19 that interfiber crosslinking in sheet, board or pad form normally produces very large quantities of knots and nits. On p 15, par 49 Applicant states that the crosslinked sheets produced according to the instant invention have lower knot and nit content, but not an absence of knots and nits (see p 22, Table 3; p 24, Table 6; p 26, Table 9), thus leading one to assume that some interfiber crosslinking has occurred. Graef et al (US 2002/0112296) teaches that polycarboxylic acids and polymeric carboxylic acids can cause both intrafiber and interfiber crosslinking of cellulosic fibers (p 2, pars 26-26 and 31), thus it would be

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expected by one of skill in the art that both kinds of crosslinking will occur to some extent in the instant invention and in the crosslinked sheet of Sun et al, and that wet strength properties as well as absorbent properties can be enhanced. Motivation to combine the teachings of Sun et al with Chatterjee et al is given by Chatterjee et al in col 2 line 48 to col 3, line 17, which recites several advantages: 1) decreasing the costs of production by eliminating the process of defibering the board prior to crosslinking, 2) increasing fluid absorption and retention capacity, 3) improving dry and wet resilience and 4) lowering the knot content. One of ordinary skill in the art would be strongly motivated for the above reasons to combine the teachings of the two references with a reasonable expectation of success.

Applicant argues on p 11 that, because Sears et al teaches using mercerized fibers, it teaches away from the instant invention. Applicant also argues that there is no teaching to combine Sears et al with Chatterjee et al. Since both patents pertain to caustic treated and crosslinked cellulosic fibers in sheet form, they are closely analogous art. The motivation to combine is the same as that given in the previous paragraph. Chatterjee also discloses treating with from 5-12% of a cold caustic solution. The instant Specification teaches that well-known mercerizing conditions include treatment with caustic at greater than 10% sodium hydroxide strength. The disclosure of Chatterjee thus teaches that treatments under mercerizing conditions as well as under non-mercerizing conditions are functionally equivalent. One of ordinary skill in the art would be motivated to combine the teaching of Sears et al with Chatterjee

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et al with a reasonable expectation of success in achieving the disclosed advantages of cost, absorbent properties and wet resilience.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dennis Cordray whose telephone number is 571-272-8244. The examiner can normally be reached on M - F, 7:30 -4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steven Griffin can be reached on 571-272-1189. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



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